Forest Sciences

Prince Rupert Forest Region

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Why Do Partial Cutting?

Research Issue Groups:

Forest Biology

Forest Growth

Soils

Wildlife Habitat

Silviculture

Timber Harvesting

Ecosystem Inventory and Classification

Biodiversity

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Definition of Partial Cutting

Partial cutting is a more inclusive term then "selection systems" or "unevenaged management." It means any prescription where mature trees are deliberately left on site. Recent thinking on silviculture systems (3,6,7) recommends stepping out from the restrictive confines of traditional textbook definitions (shelterwood, selection, etc.). Rather, silvicutural systems can be thought of as a continuum of levels, frequency, and pattern of tree harvesting. This creates predictable light environments for growing trees, and structural diversity for wildlife habitat. Commercial thinning also fits under partial cutting for purposes of this discussion.

The proportion of B.C.'s harvest coming from partial cutting has remained at only 10-15%, or even declined in the last 5 years[1]. This is despite extensive public controversy over clear-cutting; the potential role partial cutting can play in meeting timber supply objectives[2]; a substantial research effort; and recognition in the Forest Practices Code[3] and Ministry policy[4] that all silvicultural systems should be considered.

Clearly, there is a general reluctance by forest managers to apply alternatives to clear-cutting. In this note, we briefly outline what we see as the benefits to wider use of partial cutting, drawing on our experience at the Date Creek research trial and elsewhere.

Wildlife Habitat, Mushrooms and Biodiversity

One of the profound changes occurring to our forests is a dramatic decrease in the amount of mature and old-growth forest, with a resulting reduction in the abundance of associated flora and fauna. There is now good evidence that partial

[1] Provincial Silviculture Systems Workshop, November 4-6, Richmond B.C.

[2] Rationale for Allowable Annual Cut, Kalum Timber Supply Area, January 1, 1996.

[3] OPR 24, 43

[4] Policy Manual, Vol. 1, section 2.6

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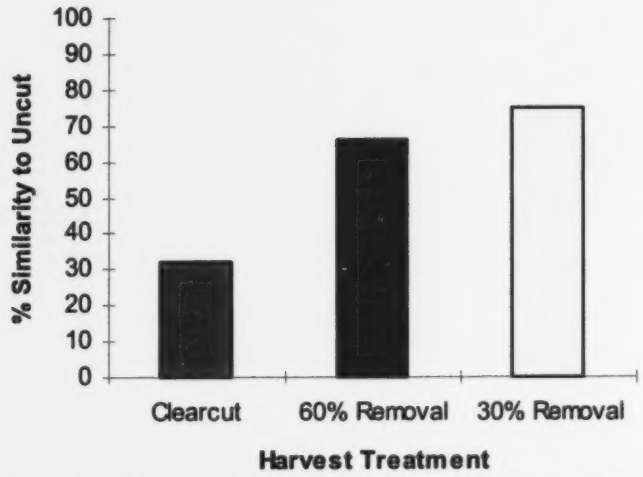

Figure 1. Similarity of bird communities in cut forests, compared to uncut forest at Date Creek. (Similarity of stands, pre-treatment, averaged 75%).

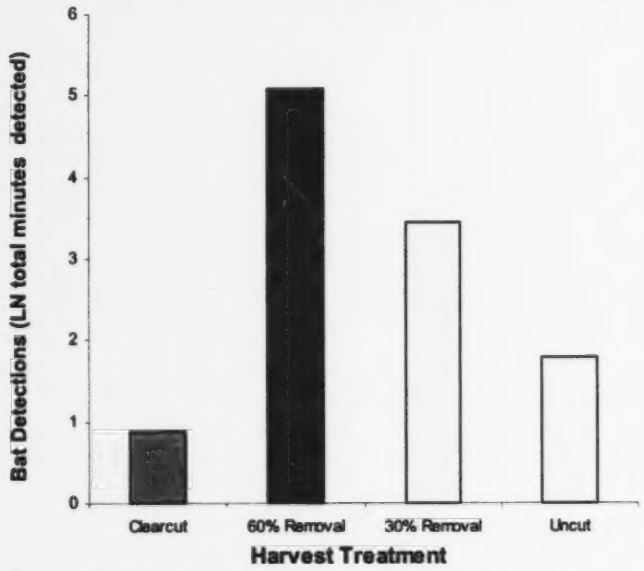

Figure 2. Bat use of treatments (detections) at Date Creek.

cutting can be used to help maintain mature forest habitat, while still allowing timber extraction.

At our Date Creek site (ICHmc), for example, we were unable to detect any substantial change in the bird community after removing 30% of the stand volume (14). Even after 60% removal, most mature forest species remained relatively abundant. We found that forest bats, red-backed voles, and several bird species actually preferred the partial cut treatments (13,14). These are not unique findings, but have also been noted in other partial cutting trials in B.C. and elsewhere (1,7,8,9,12).

Since habitat value does not decline linearly with per cent canopy removal, the same volume of harvest applied through partial cutting will have less effect on habitat then clearcutting, even though a greater area is harvested.

We also expect that partial cutting will maintain habitat for larger species of management concern such as marten, fisher, goshawk, and forest owls, if features such as wildlife trees are maintained. The only way we can find out for sure is to apply partial cutting at a larger, operational scale. Varying the intensity and spatial pattern (even vs. patch removal) of partial cut treatments should meet the range of conditions most favourable to various wildlife.

"There is now good evidence that partial cutting can be used to help maintain mature forest habitat, while still allowing timber extraction"

Studies at Date Creek also indicate that production of mushrooms is maintained in partial cuts; a resource important to the local economy. In the fifth post treatment year, there was no reduction in mushroom biomass or diversity in stands with $\geq 20 m^2/ha$. In contrast, there was a substantial reduction in mushroom production in clearcuts.

If mature forest habitat is desired, we suggest maintaining a minimum (preferably more) of $20 m^2/ha$ basal area with a mix of tree species and diameters.

Partial cutting is not a panacea, and still means removing much of the biomass from the forest. Intensive partial cutting can eliminate features such as large trees, snags and coarse woody debris just as certainly as clear-cutting does. Thus in all silvicultural systems leaving some trees to grow longer, and eventually die, will be necessary. Unmanaged areas also remain vital for conservation, and as benchmarks for comparing managed stands (2).

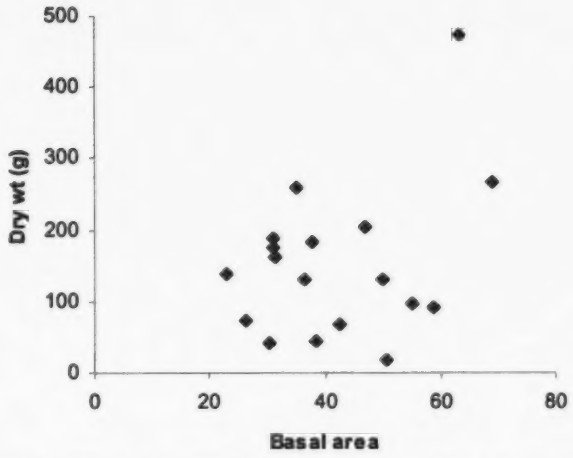

Figure 3. Effect of stand density on mushroom biomass, 5 years post-logging at Date Creek.

Partial Cutting and Timber Supply

There is a perception among many operational foresters that greater application of partial cutting will result in reduced timber supply, and is only applicable to unevenaged stands of shade tolerant species.

In many situations, however, partial cutting can provide just as good a long-term yield as clear-cutting, even better yields in some situations through more effective use of growing space and capture of mortality. Further, partial cutting options are not limited to the "inverse J" age structure of classic selection systems or for highly shade-tolerant species. At Date Creek, lodgepole pine seedlings (a light-demanding species) showed relatively little increase in height growth once opening size reached 0.2 ha. Thus large openings are not silviculturally necessary to grow trees.

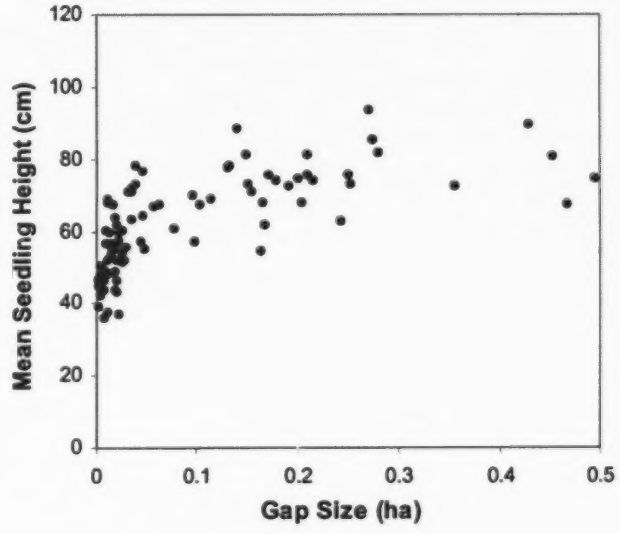

Figure 4. Mean third year height of lodgepole pine seedlings by opening size at Date Creek. (Pine seedlings in full lightconditions of clearcuts averaged 87 cm in height).

Another common criticism is that partial cuts are very vulnerable to windthrow losses. In fact there is little evidence that carefully prescribed partial cutting has a significantly higher rate of windthrow than the forest generally (5). Further, the windthrow common at clear-cut boundaries is avoided.

The most immediate positive effect for timber supply of partial cutting is in allowing access to timber that would other wise be reserved from harvesting due to habitat, visual quality, or other concerns.

Partial Cuts Can Yield Timber Just As Well As Clearcuts

One example comes from the Aleza Lake project in SBSwk1 forest near Prince George (11). Partial cuts done in the 1950's were revisited in the 1990's. With about 50% of the basal area removed, after about 40 years the basal area increment has rivalled that of plantations. Thus the yield, over an 80-100 year period could be equal to, or possibly exceed, that from an even-aged plantation.

Cost of Partial Cutting

This is likely the main obstacle to wider application of partial cutting. Partial cutting has a higher road-side wood cost in comparison to clear-cutting (12,15), but the magnitude of the difference is highly variable. In many of the recent trials in B.C., higher costs have been at least partly due to a lack of experienced personnel and appropriate machinery. With greater experience and more appropriate harvesting technology, we can expect lower costs. Also, most of the planning and layout cost occurs today, while much of the harvest occurs during future entries. Costs for layout, road and trail establishment will presumably be lower for future entries.

In at least some situations, partial cutting may provide financial returns as good as, or better than, clear-cutting (10). Developing the most cost-effective techniques should be a priority topic for future trials of partial cutting.

The cost of partial cutting should also be considered in the broader management context. Under the Forest Practices Code, harvest unit size and adjacency rules are relaxed with partial cutting[5], thus allowing greater scheduling flexibility. As part of a biodiversity and ecosystem management approach, larger clearcut-with-reserve blocks can be included in development planning, which will offset higher costs on the partial-cutting harvest units. There are also indirect economic benefits of partial cutting, such as the potential mushroom or trapping value that are maintained, and potentially reduced silvicultural costs (e.g., brushing, planting).

Summary

We are not advocating a wholesale switch to partial cutting. Clearcutting (or its variations) remains ecologically and silviculturally appropriate in many areas. There are also many situations where partial cutting simply isn't safe for workers or isn't operationally feasible; or where economic objectives take precedence. We are, however, suggesting that partial cutting could be much more widely used than at present.

Partial cutting has potential for helping to achieve both environmental and timber supply objectives. Research has shown partial cutting is ecologically and silviculturally feasible in many forest types. While we still have much to learn in refining prescriptions, it is now up to operational foresters and loggers to develop the experience and innovation necessary to make it work. Large scale, operational adaptive management trials are now needed.

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[5] Forest Practices Code, OPR 22

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